

VISITS OF BATS TO FLOWERS OF *Lafoensia glyptocarpa* KOEHNE (LYTHRACEAE)

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(With 1 figure)

ABSTRACT

In the present study visits of phyllostomid bats to the *Lafoensia glyptocarpa* Koehne flowers were observed at Federal Rural University of Rio de Janeiro, Itaguaí municipality, Rio de Janeiro state. This tree species present floral characteristics to fit the “chiropterophilous syndrome”, encouraging the visit of four species of bats which showed different behavior patterns, according to their size, weight and access to the food resources. *Glossophaga soricina* (Pallas, 1766) showed hovering behavior. *Phyllostomus hastatus* (Pallas, 1767) and *Platyrrhinus lineatus* (Geoffroy, 1810) showed landing behavior and *Artibeus lituratus* (Olfers, 1818) fed during the quick flight, without a real landing.

Key words: Chiroptera, chiropterophily, bats, flowers, *Lafoensia glyptocarpa*.

RESUMO

Visitas de morcegos às flores de *Lafoensia glyptocarpa* KOEHNE (LYTHRACEAE)

No presente trabalho, foram estudadas visitas de morcegos filostomídeos às flores de *Lafoensia glyptocarpa* Koehne na área da Universidade Federal Rural do Rio de Janeiro. Essa espécie vegetal apresenta atributos florais que estão de acordo com a “Síndrome da Quiropterofilia” e recebe visitas de quatro espécies de morcegos que apresentam comportamento variado ao abordar as flores, conforme o seu tamanho, peso e acesso ao alimento. *Glossophaga soricina* (Pallas, 1766) adeja, *Phyllostomus hastatus* (Pallas, 1767) e *Platyrrhinus lineatus* (Geoffroy, 1810) pousam e *Artibeus lituratus* (Olfers, 1818) realiza passagens rápidas sem pousar.

Palavras-chave: Chiroptera, quiropterofilia, morcegos, flores, *Lafoensia glyptocarpa*.

INTRODUCTION

The importance of utilization of floral resources by bats has been admitted by several authors such as Alvarez & Quintero (1970), Carvalho (1961), Gardner (1977) e Heithaus *et al.* (1975), due to the great number of plant species which receive constant visits of those mammals.

The Myrtales order involves families such as Myrtaceae, Melastomataceae, Lythraceae, Sonneratiaceae e Onagraceae which receive visits of bats belonging to Pteropodidae and Phyllostomidae families (Dobat & Piekert-Holle, 1985;

Gardner, 1977; Pijl, 1936/1937; Vogel, 1958/1969). In Lythraceae family, the visit of bats was suggested by Vogel (1958) based on observations of *Lafoensia puniceifolia* DC. specimens, in Panamá.

Sazima & Sazima (1975) recorded visits of four phyllostomatid bats to *Lafoensia pacari* St. Hil. in Brazil. These authors recorded the visit of *Phyllostomus discolor* (Wagner, 1843) to *Lafoensia glyptocarpa* flowers in 1977.

Since *L. pacari* has four bat species which visit their flowers, and there was indication of one only species visiting *L. glyptocarpa*, we studied this plant in order to verify existence of other bat

species that utilize its pollen and nectar as food resources.

In such case, we recorded four species of bats visiting the flowers of *Lafoensia glyptocarpa* in Rio de Janeiro state. Every bat showed different behavior patterns of approximation to flowers, according to their size and weight.

MATERIAL AND METHODS

During June and July 1989, flowers of *Lafoensia glyptocarpa*, were observed at Federal Rural University of Rio de Janeiro campus (22°45'S and 43°41'WGr), Itaguaí municipality, Rio de Janeiro state.

Flowers of *Lafoensia glyptocarpa* were observed in sessions from 17:00 h to 23:00 h. Mist nets measuring 12 x 2.6 m were extended in front of canopy, in order to catch nocturnal visitors.

Slides with pollen were done for posterior comparison with material found on the animals (Silva, 1991). Plant voucher specimens are deposited at the herbarium of Departamento de Botânica of UFRRJ.

During observation period, the number of bats visitors and their behaviour on the inflorescences were recorded. In order to confirm the visit slides with pollen found on the fur and gastrointestinal tract of each bat were done by direct method (Silva, 1991). Specimens of bats were deposited as voucher in the Adriano L. Peracchi collection, Instituto de Biologia of UFRRJ, (ALP: 5291, 5292, 5293, 5294, 5295 and 5296).

RESULTS

Description of the plant:

Lafoensia glyptocarpa, is a tree that measures approximately eight meters of height. The inflorescences are simple racemes, with big hermafrodite flowers. Each flower bears fifteen free stamens which are disposed around the cup. The anthers are yellow in the color.

The blooming period extends from May to July. Anthesis begins at 17:30 h and the nectar is available in very large amounts, dripping out of the cup. The flowers last only one night and the stamens are retracted and wilted in following morning, and the petals unfastened from the cup.

Capsular dry fruits with winged seeds were observed in the *L. glyptocarpa* specimens studied.

Nocturnal Visitors:

Moths (Sphingidae) and bats were recorded on *Lafoensia glyptocarpa* flowers. Four bats species were recorded visiting flowers.

Glossophaga soricina: small bat, with forearm measuring from 30.0 to 39.0 mm and medium weight of 10.3 g. This species visited flowers, after 18:00 h, in group of more than five individuals which hovered briefly in front of the flowers while thrusting its snout inside the corolla to reach for nectar. During the visit, the stamens touched the back, chest, head and womb portion of the wing (Fig.1).

Phyllostomus hastatus: big bat with forearm measuring from 88.5 to 90.0 mm and medium weight of 111.0 g. Only one individual was recorded visiting alone *L. glyptocarpa* flowers, shortly at nightfall. The bat approaches the flower landing briefly, holding on branch with feet, keeping the wing backwards, and left the flower. The bat returned to the flowers, approaching them rapidly. In both approaches, only the higher flowers were visited.

Platyrrhinus lineatus: bat with forearm measuring from 44.6 to 50.6 mm and medium weight of 25.0 g. The bat arrived at flowers in group of three individuals which landed on the branches through feet and thumbs. During the visit, the bat thrust its head among the stamens to reach for nectar, causing its head, faces and chest to be dusted with pollen. The bats approach the flowers from lower and middle portion of canopy.

Artibeus lituratus: big bat with forearm measuring from 65.0 to 75.0 mm and medium weight of 72.0 g. This bat visited flowers alone in quick flights to obtain pollen and nectar. There was not a real landing, and the individuals approach the flowers from upper and middle portion of canopy. The pollen was adhered on the snout.

The visit of *G. soricina*, *A. lituratus* e *P. lineatus* were not concomitant. There was a shift times among these species, along the night. First *G. soricina*; second *A. lituratus*, and at last, *P. lineatus*.

Only *P. hastatus* visited the flowers shortly at nightfall, after arrival of other bats.

DISCUSSION

Lafoensia glyptocarpa, has all the needed characteristics to fit the “chiropterophilous syndrome” as defined by Faegri & Pijl (1971). Therefore, this species receives constant visits of bats from several subfamilies which search floral resources as food source.

During the visits, different behavior were recorded, according to the size and weight of bats, and access to food resources.

Bats with weight lower than 15.0 g; such the glossophaginae, show hovering behavior. This behavior pattern was described to *G. soricina* by several authors which observed visits of this bat to chiropterophilous flowers. *G. soricina* kept hovering behavior while was visiting *L. glyptocarpa* flowers. However this bat shows landing behavior when the nectar is inaccessible, as observed in *Kigelia aethiopica* Decne and *Kigelia africana* Benth. (Vogel, 1958; Silva, 1991), as well as mixed behavior, as observed by Carvalho (1960) in *Alexa grandiflora* Duke and *Crataeva benthamii* Eich.

Phyllostomus hastatus was observed by Carvalho (1960) while was visiting flowers of *Parkia gigantocarpa* Duke and its behavior is similar to that recorded in *Lafoensia glyptocarpa*, but the approaches were not so violent to verge flowers, inflorescences and buttons.

Sazima & Sazima (1977) observed that *Phyllostomus discolor* (Wagner, 1843) visits *L. glyptocarpa* flowers and its behavior patterns is similar to that recorded to *P. hastatus*, in the present

study. This similarity is due to size and weight of bats since. *P. hastatus* and *P. discolor* are big bats, with weight varying from 50.0 to 100.0 g. Therefore, these bat species do not hover in front of the flowers to reach food.

Artibeus lituratus shows frugivorous habit, but this species is able to seek floral resources, pollen and nectar, as food source, in period of food scarcity (Heithaus *et al.*, 1975). Silva (1991) found pollen of *Chorisia speciosa* St. Hill on gastrointestinal tract of this bat species, during the winter season (July and August).

Sazima & Sazima (1975) recorded visits of *A. jamaicensis* (Leach, 1821) to flowers of *Lafoensia pacari*; and in the present study we verified that the foraging behavior of both bat species are similar, due to approximate size and weight (65.0 to 75.0 g) presented by these species.

P. lineatus is regarded as frugivorous bat, but there are few data about its feeding habits. This bat was recorded visiting flowers of *Musa acuminata* Colla (Sazima, 1976) and *L. pacari* (Sazima & Sazima, 1975). In both observations, the behavioral pattern is similar to that reported to *L. glyptocarpa*.

Gribel (1986) observed that *P. lineatus* visited flowers of *Caryocar brasiliense* Camb; in present study, the behavior differs only in the position of the wings, which are kept backwards during the visits. However, this bat species showed landing behavior in several plant species due to its weight (25.0 g) which does not admit hovering, but allows real landing, independently access to nectar.



Fig. 1 — Visit of *Glossophaga soricina* to flowers of *Lafoensia glyptocarpa*.

CONCLUSION

The varied behavior of bats while visiting flowers of *L. glyptocarpa* is related to their morphological characteristics.

In the event of *G. soricina*, its behavior is expected because of small size and weight, and morphological adaptations which allow hovering in front of the flowers (Howell & Hodking, 1976).

P. hastatus and *P. lineatus* are not morphological adapted to nectarivory due to short snout and tongue. The size and weight of these bats do not favour hovering, compelling these to land in the branches, in order to collect food.

The big size and weight of *A. lituratus* do not allow hovering or landing in the branches of *L. glyptocarpa*. Therefore, this bat feeds in flowers of *L. glyptocarpa* in quick flights.

The diversity of species that utilize floral resources of *L. glyptocarpa*, during winter months, shows the importance of this plant species with regard to food supply for these bats specie in periods of scarcity of other resources.

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